

**Unit Name: Simple Machines Time Frame: Marking period, 50 minutes every other day.**

**Author: Fernwood Middle School**

## UNIT 2

Subject: STEM

Country: **USA**

Course/Grade: 7th grade Stem

State/Group: **NJ**

School: **Fernwood Middle School**

### UNIT SUMMARY

*The purpose of STEM in 7<sup>th</sup> grade is to build upon the skills and knowlegde that was learned from 6<sup>th</sup> grade. Problem solving activies/projects are the learning tools to problem solving. Simple machines are revisited and required in an activity along with new knowledge that consisit of wiring, electricity and simple circuitry.*

### UNIT RESOURCES

*Computer, rulers, paper, pencils, pens, various objects for measuring, chalk board, dry erase board*

#### Internet Resource Links:

[www.iteea.org](http://www.iteea.org)

## STAGE ONE

### GOALS AND STANDARDS

**TEC.5-8.8.1.8.A.5** - [Cumulative Progress Indicator] - Select and use appropriate tools and digital resources to accomplish a variety of tasks and to solve problems.

**TEC.5-8.** - [Content Statement] - The use of digital tools and media-rich resources enhances creativity and the construction of knowledge.

**TEC.5-8.8.1.8.E.1** - [Cumulative Progress Indicator] - Gather and analyze findings to produce a possible solution for a content-related or real world problem using data collection technology.

**TEC.5-8.** - [Content Statement] - Information accessed through the use of digital tools assists in generating solutions and making decisions.

**TEC.5-8.** - [Content Statement] - Technology systems impact every aspect of the world in which we live.

**TEC.5-8.** - [Content Statement] - The design process is a systematic approach to solving problems.

**TEC.5-8.8.2.8.B.1** - [Cumulative Progress Indicator] - Design and create a product using the design process that addresses a real world problem with specific criteria and constraints.

**TEC.5-8.8.2.8.B.2** - [Cumulative Progress Indicator] - Identify the design constraints and trade offs involved in designing a prototype, (how the prototype might fail, and how it might be improved) by completing a design problem and reporting results in a multimedia presentation.

**TEC.5-8.8.2.8.B.3** - [Cumulative Progress Indicator] - Solve a science-based design challenge and build a prototype using science and math principles throughout the design process.

**TEC.5-8.8.2.8.E.1** - [Cumulative Progress Indicator] - Work in collaboration with peers and experts in the field to develop a product using the design process, data analysis, and trends, and maintain a digital log with annotated sketches to record the development cycle.

### ENDURING UNDERSTANDINGS

*Students will understand the design loop process and get a better understanding of the importance of researching, designing and completing a problem with great success.*

- *Creating a plan using the design loop steps in order to problem solve any situation.*
- *The students can use this process for everyday life.*
- *Students who are not successful with problem solving do not follow a plan.*

### ESSENTIAL QUESTIONS

**How can simple machines be used to make everyday tasks easier?**

**How can I apply my new learned stem skills to my everyday life?**

**When can you apply problem solving techniques?**

**Why is problem solving a learned skill?**

### KNOWLEDGE AND SKILLS

*Students will know problem solve using the design loop for Stem projects and for everyday life.*

*Content/ topics/ sections covered: design loop, measuring, safety, tool safety and usage, mechanical drawing, sketching, researching and problem solving.*

*Students will be able to create a plan to get an letter grade of an A for their current Math class.*

## STAGE TWO

### PERFORMANCE TASKS

**Invention crusade,** Design and construct a model of a product that will assist a small child in doing a household task. Remember, design the gadget so that people with different physical abilities can use it too.

**Light source,** The National Weather Service is calling for major storms the next few days, resulting in residential power blackouts and dangerous conditions out on the roads due to fallen branches. You look for your flashlight so you can be prepared, but it is nowhere to be found! Fortunately, you just learned about simple circuits and LED's, and you have a bunch of recycled materials scattered around the house. If you could design and build your own flashlight from simple materials- instead of buying one from the store- you could create a technological product that meets your exact specifications, and saves you a few bucks in the process!  
**Problem Statement:** Your home and the roadways can be dangerous environments when performing emergency tasks in the dark, such as walking up and down stairs or changing a car tire. Storms are on their way, and you don't have an emergency light

**Candy dispenser,** Your aunt Laura, the "the candy connoisseur" and "part-time scientist" has innovated a new way to make candy to taste like many different flavors. For example, she has discovered a way to make jellybeans that taste like chocolate ice cream, hotdogs with ketchup, and PB & J. She would like to share her new candy flavors with the public by offering free samples in stores. She hopes that by offering free samples, people will like them so much that they will go out and buy them by the jars and make her rich and famous. However, she needs someone to "invent" a candy

dispenser for her

#### **OTHER EVIDENCE**

*Measuring quiz (s)*

*Project grades*

### **STAGE THREE**

#### **LEARNING PLAN**

*What activities, experiences, and lessons will lead to achievement of the desired results and success on assessments?*

*How will progress be monitored?*

*Progress will be monitored through oral challenges, warm-up drills and visual observation.*